

Office Action Summary

Application No.

09/894,125

Applicant(s)

YAMAZAKI ET AL.

Examiner

Brook Kebede

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1 and 7 is/are allowed.
- 6) ☒ Claim(s) 2-6 and 8-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 18 and 31-46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The rejection that was set forth in Paper No. 13 is maintained and repeated herein below as record.

Claim 18, as being dependent of any one of base independent claims 1-12, recites "wherein said semiconductor device is at least one selected form the group consisting of a personal computer, a video camera, a mobile computer, a player using a recording medium, a goggle-type display, a digital camera, and a projector" Since all the base independent claims are clearly call for process of forming the device which is a thin crystalline silicon film transistor (TFT), the claim does not establish a base how different embodiments of a personal computer or a video camera or a mobile computer or a player using a recording medium or a goggle-type display or a digital camera or a projector are formed. Therefore, the scope of the claim cannot be determined and the claim is vague and indefinite. Also see *Ex parte Lyell* 17 USPQ2d 1548 (8/16/1990).

Claim 31, as being dependent of base independent claim 19, recites "wherein said semiconductor device is at least one selected form the group consisting of a personal computer, a video camera, a mobile computer, a player using a recording medium, a goggle-type display, a

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digital camera, and a projector” Since the base independent claim is clearly call for process of forming the device which is a thin crystalline silicon film transistor (TFT), the claim does not establish a base how different embodiments of a personal computer or a video camera or a mobile computer or a player using a recording medium or a goggle-type display or a digital camera or a projector are formed. Therefore, the scope of the claim cannot be determined and the claim is vague and indefinite. Also see *Ex parte Lyell* 17 USPQ2d 1548 (8/16/1990).

Claim 32, as being dependent of base independent claim 20, recites “wherein said semiconductor device is at least one selected form the group consisting of a personal computer, a video camera, a mobile computer, a player using a recording medium, a goggle-type display, a digital camera, and a projector” Since the base independent claim is clearly call for process of forming the device which is a thin crystalline silicon film transistor (TFT), the claim does not establish a base how different embodiments of a personal computer or a video camera or a mobile computer or a player using a recording medium or a goggle-type display or a digital camera or a projector are formed. Therefore, the scope of the claim cannot be determined and the claim is vague and indefinite. Also see *Ex parte Lyell* 17 USPQ2d 1548 (8/16/1990).

Claims 33-45, as being dependent of base independent claims 1-12,19, and 20 respectively, recite “wherein said semiconductor device is an organic electro-luminescence display device.” Since the base independent claims are clearly call for process of forming the device which is a thin crystalline silicon film transistor (TFT), the claims do not establish a base how different embodiments of an organic electro- luminescence display device are formed. Therefore, the scope of the claim cannot be determined and the claim is vague and indefinite. Also see *Ex parte Lyell* 17 USPQ2d 1548 (8/16/1990).

Accordingly, claims 18, 31-46 have not been further treated on the merit.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claim 2-6, 8-17 and 19-30 rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. (US/6,077,731) in view of Kudo et al. (JP/09186336).

Re claims 2-6, 8-12, 19 and 20, Yamazaki et al. disclose a method of manufacturing a semiconductor device comprising the steps of: forming a semiconductor film comprising silicon over a substrate; irradiating said semiconductor film with laser light for crystallizing said semiconductor film; removing an oxide film from a surface of the semiconductor film by etching after the irradiation of the laser light; and leveling the surface of the semiconductor film by heating after removing said oxide film (see Figs. 5A - 6F) by containing the concentration of oxygen or oxide compound less than 1 ppm (i.e. less than 10 ppm as claimed) (see Col. 13, lines

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10-18); and leveling the surface of the semiconductor film by heating after the treatment with said hydrofluoric acid in reducing atmosphere such as hydrogen or inert gases such as nitrogen (see Col. 1, line 5 – Col. 128, line 65).

Although Yamazaki et al. disclose irradiating said semiconductor film (i.e., an amorphous silicon film) with a leaser light for crystallizing said semiconductor film, Yamazaki et al. silent irradiating said semiconductor film with leaser light in air.

Kudo et al. disclose method of manufacturing thin film transistor the method includes depositing an amorphous silicon film (25) (i.e., a semiconductor layer) and irradiating the amorphous silicon film (25) with an excimer laser in atmosphere containing an air in order to dehydrogenate the amorphous silicon film and change into polysilicon thin film (see Abstract and Drawing 2).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant(s) claimed invention was made to have provided Yamazaki et al. reference with irradiating on the semiconductor film (i.e., amorphous silicon film) in air as taught by Kudo et al. because the laser irradiation in air would have provided dehydrogenation of the amorphous silicon film and convert it to polysilicon thin film.

Re claim 13, as applied to claims 1-12 above, Yamazaki et al. disclose all the claimed limitations including the limitation wherein the step of leveling the surface of said semiconductor film is conducted by furnace annealing (see Col. 1, line 5 – Col. 128, line 65).

Re claim 14, as applied to claims 1-12 above, Yamazaki et al. and Kudo et al. in combination disclose all the claimed limitations including the limitation wherein the step of

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leveling the surface of said semiconductor film is conducted between 900 and 1200° C see Col. 1, line 5 – Col. 128, line 65).

Re claim 15, as applied to claims 3, 6, 9, and 12 above, Yamazaki et al. and Kudo et al. in combination disclose all the claimed limitations including the limitation wherein said inert gas is nitrogen.

Re claim 16, as applied to claims 2, 5, 8, and 11 above, Yamazaki et al. and Kudo et al. in combination disclose all the claimed limitations including the limitation wherein said reducing atmosphere comprises hydrogen see Col. 1, line 5 – Col. 128, line 65).

Re claim 17, as applied to claims 1-12 above, Yamazaki et al. and Kudo et al. in combination disclose all the claimed limitations including the step of treating a surface of the semiconductor film with a buffered hydrofluoric acid before the irradiation of the laser light see Col. 1, line 5 – Col. 128, line 65).

Re claim 21, as applied to claim 19 above, Yamazaki et al. and Kudo et al. in combination disclose all the claimed limitations including wherein the step of leveling the surface of said semiconductor film is conducted by furnace annealing see Col. 1, line 5 – Col. 128, line 65).

Re claim 22, as applied to claim 20 above, Yamazaki et al. and Kudo et al. in combination disclose all the claimed limitations including wherein the step of leveling the surface of said semiconductor film is conducted by furnace annealing see Col. 1, line 5 – Col. 128, line 65).

Re claim 23, as applied to claim 19 above, Yamazaki et al. and Kudo et al. in combination disclose all the claimed limitations including wherein the step of leveling the

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surface of said semiconductor film is conducted between 900 and 1200° C see Col. 1, line 5 – Col. 128, line 65).

Re claim 24, as applied to claim 20 above, Yamazaki et al. and Kudo et al. in combination disclose all the claimed limitations including wherein the step of leveling the surface of said semiconductor film is conducted between 900 and 1200° C see Col. 1, line 5 – Col. 128, line 65).

Re claim 25, as applied to claim 19 above, Yamazaki et al. and Kudo et al. in combination disclose all the claimed limitations including wherein said atmosphere in said leveling step contains an inert gas see Col. 1, line 5 – Col. 128, line 65).

Re claim 26, as applied to claim 20 above, Yamazaki et al. and Kudo et al. in combination disclose all the claimed limitations including wherein said atmosphere in said leveling step contains an inert gas see Col. 1, line 5 – Col. 128, line 65).

Re claim 27, as applied to claim 19 above, Yamazaki et al. and Kudo et al. in combination disclose all the claimed limitations including wherein said atmosphere in said leveling step contains a reducing atmosphere see Col. 1, line 5 – Col. 128, line 65).

Re claim 28, as applied to claim 20 above, Yamazaki et al. and Kudo et al. in combination disclose all the claimed limitations including wherein said atmosphere in said leveling step contains a reducing atmosphere see Col. 1, line 5 – Col. 128, line 65).

Re claim 29, as applied to claim 19 above, Yamazaki et al. and Kudo et al. in combination disclose all the claimed limitations including further comprising a step of treating a surface of the semiconductor film with a buffered hydrofluoric acid before the irradiation of the laser light see Col. 1, line 5 – Col. 128, line 65).

Re claim 30, as applied to claim 20 above, Yamazaki et al. and Kudo et al. in combination disclose all the claimed limitations including a step of treating a surface of the semiconductor film with a buffered hydrofluoric acid before the irradiation of the laser light see Col. 1, line 5 – Col. 128, line 65).

Allowable Subject Matter

5. Claims 1 and 7 are allowed over prior art of record.
6. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record neither anticipates nor renders obvious the claimed subject matter of the instant application as a whole either taken alone or in combination, in particular, prior art of record does not teach “removing a natural oxidation film formed on a surface of the semiconductor film by etching after the irradiation of the laser light,” as recited in claims 1 and 7

Response to Arguments

7. Applicants’ arguments with respect to claims 1 and 7 have been considered but are moot in view of the allowable subject matter that set forth herein above.
8. Applicants’ arguments filed on February 25, 2003, with respect to claims 2-6 and 8-46 have been fully considered but they are not persuasive.

With respect to the IDS filed on June 29, 2001, the IDS was considered by the Examiner in part. Regarding those references crossed in PTO-1449 of Paper No. 2, the Examiner was unable to find these references in parent case 09/352,198 as well as in the instant application. Therefore, it is the duty and obligation that applicants to provide these references so that the Examiner can consider them.

With respect to rejection under 35 U.S.C § 112 second Paragraph (i.e., for rejection of claims 18 and 34-46), applicants argued that "With respect to claims 18, 31 and 32, the specification teaches that the term "semiconductor device" means any device functioning by using semiconductor characteristics (page 1, lines 11-16). As such, the semiconductor device includes not only a single semiconductor component such as a thin film transistor (TFT), but also an electro-optical device including TFTs, a semiconductor circuit including TFTs and electronic equipment including TFTs. The specification also teaches that such electronic equipment includes a video camera, a digital camera, etc. as recited in claims 18, 31, and 32 (pages 22-23). The Applicants further submit that one with ordinary skill in the art is capable of determining the scope of the claims in light of the specification and that the scope includes an electro-optical device including TFTs, a semiconductor circuit including TFTs and electronic equipment including TFTs. Therefore, the Applicants respectfully submit that claims 18, 31 and 32 are definite. With respect to claims 33-46, the specification teaches that the semiconductor device of the present invention can also be used when an active matrix type electrooptical device such as a liquid crystal display device or an EL (electroluminescence) display device is fabricated (pages 16-17). Therefore, the Applicants respectfully submit that the scope of claims 33-46 is definite..."

The Examiner respectfully disagrees with applicants contention for the following reasons:

For example, Claim 1 recites "A method of manufacturing a **semiconductor device** comprising the steps of: forming a semiconductor film comprising silicon over a substrate; irradiating said semiconductor film with laser light in air for crystallizing said semiconductor film; removing a natural oxidation film formed on a surface of the semiconductor film by etching

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after the irradiation of the laser light; and leveling the surface of the semiconductor film by heating after removing said natural oxidation film.”

Claim 18 recites “A method manufacturing a semiconductor device according to an one of claims 1-12, wherein said semiconductor device is at least selected from the group consisting of a personal computer, a video camera, a mobile computer, a player using a recording medium, a goggle-type display, a digital camera, and a projector.

By rewriting claim 18 including all the limitation of Claim 1, claim 18 recites as the following.

A method of manufacturing a semiconductor device at least selected from the group consisting of a personal computer, a video camera, a mobile computer, a player using a recording medium, a goggle-type display, a digital camera, and a projector comprising the steps of: forming a semiconductor film comprising silicon over a substrate; irradiating said semiconductor film with laser light in air for crystallizing said semiconductor film; removing a natural oxidation film formed on a surface of the semiconductor film by etching after the irradiation of the laser light; and leveling the surface of the semiconductor film by heating after removing said natural oxidation film.

As shown above, applicants should have provided the Office an evidence that manufacturing process of a personal computer, a video camera, a mobile computer, a player using a recording medium, a goggle-type display, a digital camera, and a projector, and organic electro luminescence display device the way recited in claims 1-12. Therefore, the rejection under 35 USC § 112 second paragraphs set forth above is deemed proper. See also *Ex parte Lyell* 17 USPQ2d 1548 (8/16/1990).

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Regarding claims rejection of claims 2-6, 8-17, and 19-30 under 35 U.S.C. 103(a), applicants argued that "the Applicants respectfully traverse the rejection of independent claims 2-6, 8-12, 19 and 20, because the Official Action has not made a *prima facie* case of obviousness..."

In response to the applicant's argument, the Examiner respectfully submits that such an argument is not commensurate with the scope of the claims, in particular, as stated above. The difference between the instant application and Yamazaki et al. '731 is that "irradiating said semiconductor film with leaser light in air." As shown in Paragraph 3 herein above Kudo et al. JP/09186336 disclose what Yamazaki et al. '731 lacks. An the motivation to combine can be found in Kudo et al. disclosure (see Abstract). The combination of Yamazaki et al. '731 and Kudo et al. JP/09186336 teach all the claimed limitations of the instant application.

Therefore, the *prima facie* case of obviousness has been met and the rejection under 35 U.S.C. § 103 is deemed proper.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

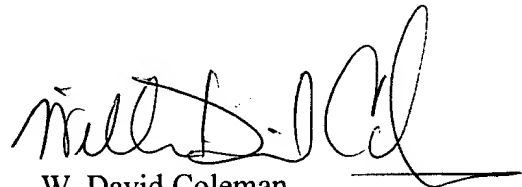
Correspondence

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brook Kebede whose telephone number is (703) 306-4511. The examiner can normally be reached on 8-5 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Brook Kebede
bk
May 15, 2003


W. David Coleman

Primary Examiner